Patent Claims

1. Arrangement of an optical modulator for fast modulation in an interferometer arm of an interferometer arrangement for heterodyne detection.

2. Arrangement according to claim 1, wherein the modulator is arranged in the measurement arm of the interferometer.

3. Arrangement according to one of the preceding claims, wherein the modulator is used simultaneously for switching and/or beam attenuation in a laser scanning microscope.

4. Arrangement according to one of the preceding claims, wherein the modulator is arranged in the reference arm of the interferometer and is the measurement arm of the illumination beam path of a laser scanning microscope (LSM).

5. Arrangement according to one of the preceding claims, wherein during a modulation by the AOM, a demodulation is carried out by a modulatable detector (PMT) which is modulated by the modulation frequency.

6. Arrangement according to one of the preceding claims, wherein the light source is a short-pulse laser.

7. Arrangement according to one of the preceding claims, wherein the laser is also used for multiphoton excitation and/or SHG excitation.

8. Arrangement according to one of the preceding claims, wherein the modulator is an acousto-optic modulator (AOM) or electro-optic modulator (EOM).

9. Arrangement according to one of the preceding claims, wherein a retroreflector is provided in the interferometer beam path for adapting the optical path length.

10. Method for operation of an arrangement according to at least one of the preceding claims, wherein the LSM is used for single-photon fluorescence imaging and/or multiphoton fluorescence imaging and the heterodyne detection is used for referencing the fluorescence to regions deep in the specimen.

11. Method according to claim 10, wherein LSM images and heterodyne images are recorded simultaneously.

12. Method according to one of the preceding claims, wherein the LSM image and the heterodyne image are superimposed.

13. Method according to one of the preceding claims, wherein reference points of the specimen are used to orient the specimen with respect to three-dimensional image stacks of the LSM.

14. Method according to one of the preceding claims, wherein reference points of the specimen are used for orientation thereof in image recordings of temporal processes.

15. Interferometric measurement arrangement for heterodyne detection, preferably in an arrangement according to one of the preceding claims, wherein a dispersive unit is provided in at least one interferometer arm, which dispersive unit splits the light into its spectral component parts and recombines these component parts, which has imaging optics which image the spectral components in a focal plane within the dispersive unit, and a light manipulator which changes the phase and/or amplitude of the spectral components is arranged in or in the vicinity of the focal plane.

16. Interferometric measurement arrangement according to claim 15 for adapting dispersion.

17. Interferometric measurement arrangement according to claim 15 for compensating dispersion when a short-pulse laser is coupled into an LSM.